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TRAINING STUDENT TEACHERS TO REPOSITION INFANTS FREQUENTLY

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We evaluated the effects of an intervention designed to increase the variety of positions experienced by infants in a child-care setting. Six student teachers were trained, using a multicomponent intervention, to reposition infants according to a chart. The intervention was successful in increasing the mean percentage of correct position changes made by all 6 student teachers, and performance gains by 3 student teachers persisted when supervisor feedback was briefly removed.

DESCRIPTORS: flattened head, feedback, infant positioning, self-recording, teacher training

Since 1992, the American Academy of Pediatrics (AAP) has recommended that infants be placed on their backs to sleep to decrease the risk of sudden infant death syndrome (SIDS) (AAP, 1992). This campaign has been associated with a decrease in SIDS, but it is also correlated with an increase in posterior plagiocephaly (i.e., flattened back of the head), a condition that affects an estimated 1 in 60 children (Biggs, 2003). Treatment often involves the use of cranial remolding orthoses, which are costly and draw negative attention to the children. If left untreated, this condition can cause mild developmental disabilities. In addition, there is some evidence that children who sleep on their backs acquire motor skills later than other children (Davis, Moon, Sachs, & Ottolini, 1998; Ratliff-Schaub et al., 2001). To offset the negative side effects associated with supine sleeping, experts recommend placing children in a variety of positions when awake (Mahoney, 2003).

A large percentage of infants are enrolled in child care; therefore, we evaluated the effects of a chart and supervisor feedback to train student teachers in an infant classroom to track each infant's daily history of positions and to reposition the infants accordingly. Our procedures were similar to those used by Kunz et al. (1982).

METHOD

Setting

Observations were conducted in a university-run infant classroom that was partitioned into several different zones designed to accommodate specific activities (e.g., feeding, napping, and play). Student teachers were assigned to zones (LeLaurin & Risley, 1972) according to a 30-min rotating schedule, resulting in each student teacher being assigned to the play area twice on each 4-hr shift. The play area contained two play mats on opposite sides of the room on which student teachers conducted play activities. One play activity (e.g., rattles, puppets) was conducted at a time, and student teachers changed play activities every 15 min. At this time, student teachers initiated a new activity on the unoccupied play mat and were expected to change the positions of all immobile infants as they transitioned to the activity.

At any given point, 9 infants, who ranged in age from 2 to 17 months, were enrolled in the

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program. Over the course of the study, 11 infants who could not independently change their own positions (e.g., pull themselves to a sitting position) at the start of each phase were targeted for intervention. Data collection was discontinued for individual participants when those infants became able to change their own positions. Ten infants were typically developing, and 1 had Down syndrome. The number of children present in the play zone varied from 1 to 9.

Participants

Six undergraduate students who were enrolled in a practicum course in early education and intervention participated. Each student teacher was assigned to the morning shift (7:30 a.m. to 11:30 a.m.), either during the fall or summer semester, on which she worked with 2 other student teachers and a graduate student supervisor. Prior to the study, student teachers participated in a 1-day orientation during which they received written and vocal instruction on classroom procedures. During orientation, teachers were instructed to change the positions of the infants when a new toy was presented (i.e., every 15 min), and examples of appropriate positioning strategies were described and modeled.

Data Collection and Interobserver Agreement

Trained graduate and undergraduate observers recorded data from behind a one-way mirror or behind a barrier on the outskirts of the classroom, during the typical classroom routine. Student teachers were aware that they were participating in a study to increase the variety of positions infants experienced but did not know exactly when they were being observed.

Student teachers were observed between 8:15 a.m. and 10:15 a.m. This period was selected because several infants were typically present in the classroom and the 3 participating student teachers were primarily responsible for conducting play activities. Data were recorded during activity transitions, which occurred every 15 min. The observation interval began when the student teacher stood up to retrieve the new play activity and ended 1 min after all children, mobile and immobile, had been moved to the new play area. Therefore, the length of each observation varied, but was never longer than 5 min. Observers recorded the name of the infant, the new position in which the infant was placed, and the name of the student teacher who placed the infant into that position.

Five positions were considered appropriate for all of the infants: side, stomach, back, assisted sitting, and assisted standing. These positions were targeted because each provided the infants with an opportunity to practice an important motor skill (e.g., rolling, crawling). The new position was scored 1 s after both of the student teacher's hands were removed from the child's body. Data collectors recorded *back* when an infant was placed in a reclined position (i.e., torso and legs formed an angle greater than 90°), *stomach* when the infant's stomach was in contact with the floor, *side* when the infant's left or right arm and leg were in contact with the floor bearing weight, *assisted sitting* when the infant was supported with his or her torso elevated and torso and legs formed a 90° angle, and *assisted standing* when the infant was partially supported with feet touching the floor and bearing weight. For 1 participant, Heather, the knees position was included on the recommendation of a physical therapist. *Knees* was recorded when Heather's knees were touching the floor with her body in an upright position.

The goal of the intervention was for each child to experience the full range of appropriate positions before experiencing duplicate positions (i.e., a position already experienced on that day). Therefore, a position change was considered correct if the child had never experienced the particular position that day, or had already received all appropriate positions before being placed in a duplicate position. The

percentage of correct position changes made by each student teacher was calculated by dividing the number of correct position changes by the number of positioning opportunities and multiplying by 100%. Percentage of correct position changes was chosen as the primary dependent variable because it was appropriate for baseline conditions (when no one position was considered correct) and for those in which a chart specified the appropriate condition.

In addition, during the chart-plus-supervisor-feedback and the chart-without-supervisor-feedback conditions, observers recorded whether or not the student teachers used the chart correctly. The percentage of correct chart completions was calculated by dividing the number of times the student teachers used the chart correctly by the number of opportunities to use the chart and multiplying by 100%. Correct chart use was recorded when the student teacher placed the child into the position listed on the chart for the given interval and, within 1 min of moving all children to the play activity, indicated that the position had been used by (a) placing an X over the position listed on the chart for the given interval (fall) or (b) removing the appropriate hook-and-loop card from the chart and placing it in an envelope located next to the chart (summer).

A second observer simultaneously but independently collected data for a minimum of 30% of intervals for both semesters. Interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus the total number of disagreements and multiplying by 100%. An agreement was scored when both observers recorded the same information for each category during a particular observation interval. A disagreement was scored when observers scored different information for a category or when one observer failed to record any information for a particular category.

During the fall semester, interobserver agreement was 95% (range, 62% to 100%), 91% (range, 33% to 100%), and 94% (range, 70% to 100%) for the child's position, student teacher name, and correct chart use, respectively. During the summer semester, agreement was 97% (range, 50% to 100%), 97% (range, 0% to 100%), and 97% (range, 75% to 100%) for the child's position, student teacher name, and correct chart use, respectively. Agreement was strongly influenced by the number of observation intervals. In some instances, low agreement scores were obtained when only a small number of observation intervals were recorded on a given day.

Procedure

Baseline. A sheet of paper (22 cm by 28 cm) listing recommended positions was posted in the classroom. Student teachers were also reminded, approximately once per week (independent of performance), to change the infants' positions every 15 min.

Chart plus supervisor feedback. During a staff meeting held prior to the student teachers' first opportunity to use the chart, student teachers were shown pictures illustrating appropriate positions for each of the five categories listed above. Also, a dry-erase board (85 cm by 56 cm) that listed the names of each infant and specified an individualized order of positions was placed in a highly visible area of the classroom. Using this chart, student teachers were instructed to locate the appropriate position for each child, place the child into the position, and self-record the use of that position by placing an X over the position (fall) or removing the hook-and-loop card that listed the position (summer). Recording of positions was to occur within 1 min of moving all of the children to the new activity. When chart plus supervisor feedback was reinstated following the return to baseline, these instructions were repeated in an abbreviated format (e.g., with fewer examples) just prior to the student teachers' next opportunity to reposition the infants. At the end of each shift, the classroom supervisor met with the 3 student teachers as a group and provided feedback indicating how

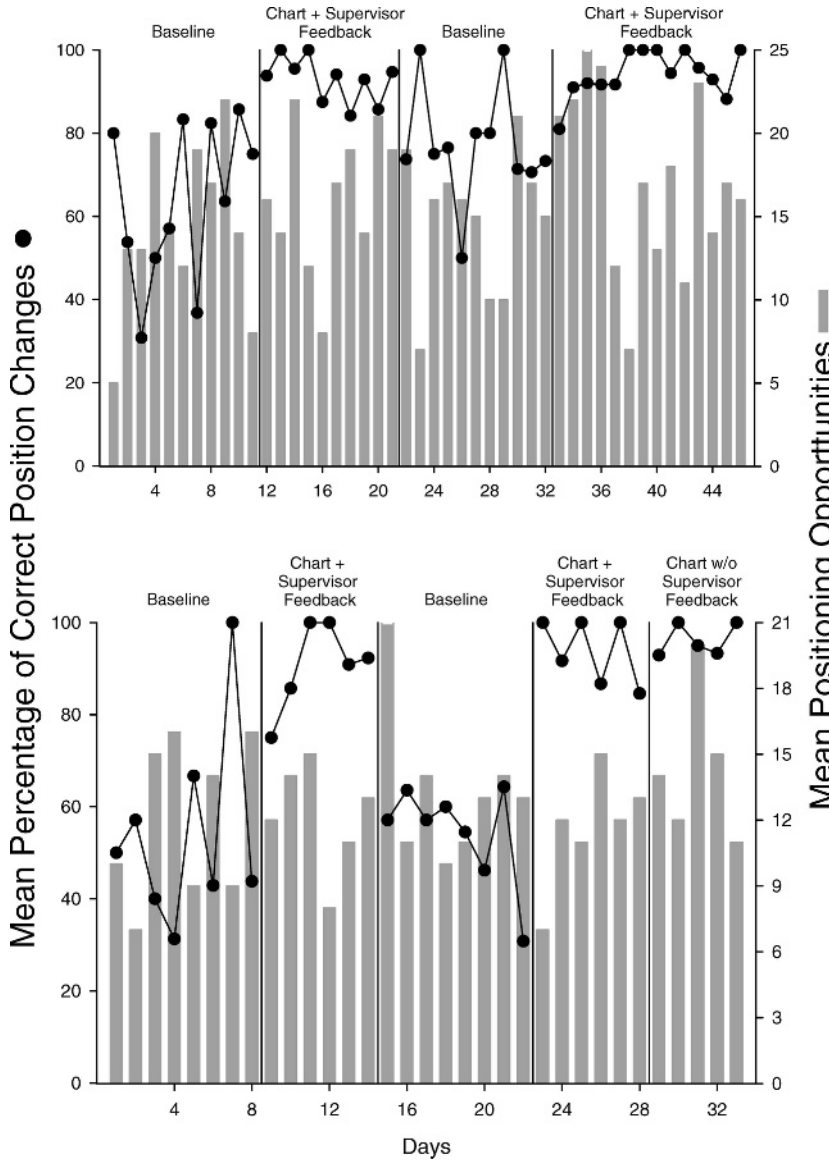

Figure 1. The mean percentage of correct position changes and mean number of positioning opportunities for Teachers 1, 2, and 3 during baseline and chart plus supervisor feedback (top). The mean percentage of correct position changes and mean number of positioning opportunities for Teachers 4, 5, and 6 during baseline, chart plus supervisor feedback, and chart without supervisor feedback (bottom).

many times they changed the position of each infant, the number of positions in which they placed each infant, and the number of opportunities on which they failed to reposition each infant correctly.

Chart without supervisor feedback. As in chart plus supervisor feedback, the chart was hung in the classroom to allow teachers to track and self-record position changes. A picture book with examples of each position was also posted;

Table 1
Results for Individual Student Teachers

Student teacher	Number of opportunities	Mean percentage correct position changes				
		Baseline	Chart plus supervisor feedback	Baseline	Chart plus supervisor feedback	Chart without supervisor feedback
1	249	52	93	75	100	
2	234	62	92	80	91	
3	204	72	94	73	99	
4	120	43	87	43	100	93
5	167	57	79	54	96	100
6	124	49	96	72	94	97

however, no supervisor feedback was provided regarding infant positioning.

RESULTS AND DISCUSSION

The top panel of Figure 1 depicts data from Teachers 1, 2, and 3, who participated during the fall semester. During baseline, student teacher performance was variable (M = 63%, range, 31% to 86%). When chart plus supervisor feedback was implemented, the mean percentage of correct position changes increased (M = 93%, range,= 84% to 100%). Performance was disrupted (M = 77%, range, 50% to 100%) during the reversal to baseline, and when chart plus supervisor feedback was again implemented, the mean percentage of correct positioning increased to high levels (M = 94%, range, 81% to 100%) relative to baseline, and this improvement was maintained for the duration of the study. The mean percentage of correct chart use for these teachers was 93% (range, 84% to 100%) and 92% (range, 75% to 100%) for the first and second chart-plus-supervisor-feedback conditions, respectively.

The bottom panel of Figure 1 depicts data for Teachers 4, 5, and 6, who participated during the summer semester. The results of the first four phases replicate those obtained during the fall semester. The mean percentage of correct position changes was substantially higher during the first (M = 91%, range, 75% to 100%) and second (M = 94%, range, 85% to 100%) chart-plus-supervisor-feedback conditions compared with the first (M = 54%, range, 31% to 100%) and second (M = 54%, range, 31% to 64%) baseline conditions. In addition, this improved performance persisted (M = 96%, range, 93% to 100%) for 5 days in the absence of supervisor feedback. Mean percentage of correct chart use was 83% (range, 75% to 93%) and 80% (range, 61% to 100%) in the first and second phases of the chart-plus-supervisor-feedback condition, respectively. During chart without supervisor feedback, the mean percentage of correct chart completion was 94% (range, 90% to 100%).

Results for individual teachers are presented in Table 1. The chart plus supervisor feedback resulted in an increase in the mean percentage of correct position changes for each student teacher. In addition, this improved performance persisted when supervisor feedback was withdrawn for Teachers 4, 5, and 6.

The chart plus supervisor feedback increased mean correct position changes made by all 6 student teachers. Our results replicate those of Kunz et al. (1982), who used diapering and play charts with supervisor feedback to improve performance of infant caregivers. In addition, our findings replicate a large body of existing research that demonstrates the effects of multicomponent, behaviorally based staff-training programs (e.g., Austin, Weatherly, & Gravina, 2005; Burg, Reid, & Lattimore, 1979; Burgio et al., 1990; Richman, Riordan,

Reiss, Pyles, & Bailey, 1988). Our study extends this research by applying similar methods to address a socially important but often overlooked problem, infant repositioning.

Our intervention consisted of a number of potentially influential components including vocal instruction, publicly posted written instructions, visual prompts, self-recording, and supervisor feedback, and the design of the study did not allow the isolation of the effects of individual components. We attempted to reduce the effort associated with the intervention by withdrawing the most labor-intensive component, the supervisor feedback, and found that improved performance by Teachers 4, 5, and 6 persisted during a brief (5-day) period without supervisor feedback. These results suggest that, after exposure to the chart plus supervisor feedback, performance gains may be maintained with a reduced schedule of supervisor feedback, or even in the absence of supervisor feedback. However, the chart-without-supervisor-feedback phase was too brief to draw firm conclusions regarding the necessity of supervisor feedback.

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